

REMARKS

Claims 1 and 4-15 are pending in the present application. Claim 15 is withdrawn from consideration. Claims 1 and 4-14 are rejected.

Claim Rejections - 35 U.S.C. §103

Claims 1, 4-6 and 14 are rejected under 35 U.S.C. §103(a) as being unpatentable over Yonehara et al. (US 2003/0159644 A1) in view of Applicants' admitted prior art ("AAPA").

The Examiner admits that Yonehara et al. do not necessarily teach the limitation that the semiconductor substrate meets a criterion of "an SFQR value ≤ 70 nm as a flatness of the front face". However, the Examiner asserts that as admitted by Applicants as many as 40% of all conventionally produced wafers satisfy the criterion and therefore, by rule of statistics all one of ordinary skills in the art has to do is make enough of said wafers in order to be certain to have one that satisfies said criterion.

Applicants submit that this rejection is overcome upon a showing of unexpectedly superior results associated with the claimed range of boron concentration.

The Examiner has correctly elected not to reject the claims as anticipated by the cited reference. Applicants note that MPEP §2131.03 states that, "When the prior art discloses a range that touches, overlaps or is within the claimed range, but no specific examples falling within the claimed range are disclosed, a case-by-case determination must be made as to anticipation. In order to anticipate the claims, the claimed subject matter must be disclosed in the reference with "sufficient specificity to constitute anticipation under the statute." What constitutes a "sufficient

specificity” is fact dependent. If the claims are directed to a narrow range, the reference teaches a broad range, and there is evidence of unexpected results within the claimed narrow range, depending on the other facts of the case, it may be reasonable to conclude that the narrow range is not disclosed with “sufficient specificity” to constitute an anticipation of the claims.

With respect to claims 1 and 14, the Examiner asserts that the claimed range as suggested by the cited reference. That is, the cited reference teaches a range of 10^{17} to 10^{20} (atoms/cm³), while the presently claimed range includes a maximum of 2×10^{17} (atoms/cm³). Therefore, the ranges overlap in the range of 1×10^{17} – 2×10^{17} (atoms/cm³). The cited reference fails to teach examples in the claimed range. Therefore, Applicants submit that the rejection would be rebutted upon a showing of unexpectedly superior results associated with the claimed range of boron concentration.

With respect to the rationale for the upper limit of 10^{17} cm⁻³ boron atoms, Applicants note that the specification indicates that the upper limit is based on the present Inventors’ finding that silicon substrates having boron concentrations of 2×10^{17} (atoms/cm³) or lower can be evaluated as having no autodoping problem.

Applicants first note that the presence or absence of autodoping at the different levels of boron concentration would have been unexpected in light of the teachings of the cited references. One skilled in the art at the time of the invention would not have known that a limit of 2×10^{17} (atoms/cm³) or lower would have resulted in silicon substrates that have no autodoping problem. The lack of autodoping problem would have been unexpected, and therefore the claimed range of

boron concentration provides an unexpectedly superior result over what would have been expected.

Furthermore, Applicants submit that the claimed range of boron results in further unexpected results.

The present Inventor found that this present invention has high gettering ability not only for iron atoms (as mentioned in Specification) but also for nickel atoms within a range of the boron at a concentration not lower than 5×10^{16} (atoms/cm³) nor higher than 2×10^{17} (atoms/cm³). Applicants attach hereto a Reference Figure that graphically shows further evidence of unexpectedly superior results. If needed, Applicants will prepare an Inventor's Declaration detailing the above further unexpected results.

Therefore, Applicants submit that unexpected results associated with the claimed amounts of boron in the substrate rebuts the rejection for obviousness.

Claims 7-11 are rejected under 35 U.S.C. §103(a) as being unpatentable over Yonehara and AAPA as applied to claim 2 above, and further in view of Fitzgerald (US 2002/0123167 A1). Yonehara et al. in view of AAPA. The Examiner admits that neither reference necessarily teaches the claimed layered structure of SiGe and Si, but the Examiner asserts that there is a specific suggestion by Yonehara et al. that a layered structure of SiGe on silicon could be used to generate stress in an SOI structure ([0411]-[0412]).

The Examiner notes that the limitation of claim 10 only further limits the method of making. Therefore, the further limitation defined by claim 10 fails to distinguish over the cited reference.

Claim 12 is rejected under 35 U.S.C. §103(a) as being unpatentable over Yonehara et al. as and AAPA applied to claim 1 above, and further in view of Hurley (5,698,474). The Examiner concludes that it would have been obvious to include the further limitation of claim 12 in view of Hurley, who teaches exposing the entire backside as a flat, thinned and mirror polished for the specific purpose of creating a window suitable for inspection (title, abstract and col. 5, lines 8-12).

Claim 13 is rejected under 35 U.S.C. §103(a) as being unpatentable over Yonehara et al. and AAPA as applied to claim 1 above, and further in view of Steckl et al. (5,759,908). The Examiner concludes that it would have been obvious to include SiC as a substrate material for an SOI in view of Steckl et al., who teach silicon carbide SOI structures (title, abstract) for the specific purpose of inter alia its higher breakdown voltage (col. 1, lines 10-22).

With respect to the above rejections of claims 7-13, Applicants note that all of these claims depend from claim 1, and because Applicants submit that the rejection of claim 1 has been rebutted by a demonstration of unexpectedly superior results associated with the claimed range of boron concentration, and because the dependent claims necessarily include at least the limitations of the parent claim 1, the rejection of dependent claims 7-13 should be overcome as well.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

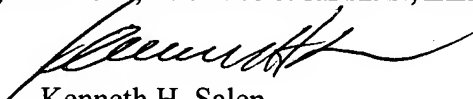
Application No. 10/743,793
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Response under 37 C.F.R. §1.111
Response filed: May 3, 2006

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,
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Enclosure(s): Reference Figure **(for explanatory purposes only, not as a replacement sheet)**



-- Reference Figure --

